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ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

A Portable Irrigation System for Remote Sites[1]

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A simple but highly reliable truck-mounted system delivers 500 gallons of water through 500 emitters on 10 drip lines in about 50 minutes. It can be used for seedling establishment, or to maintain transplants. It should prove useful in remote locations with critical plant establishment needs.

Keywords: Irrigation systems, revegetation

Revegetating steep slopes after mechanical disturbances such as mining or dam construction is often difficult, especially where natural precipitation is low. Pressurized water systems are seldom available at these remote sites. To assist in revegetating slopes in remote areas, we developed a portable irrigation system consisting of a 500-gallon tank and two centrifugal gasoline engine pumps mounted on a 1-1/2 ton truck (fig. 1).

Description of the System

The pump for filling the tank is a 3-1/2-h.p. gasoline engine centrifugal with a high rated delivery. This was used to lift water into the tank from a reservoir. The irrigation delivery pump is a 3-h.p. gasoline engine centrifugal with a low delivery rating for low pressures. Suction hose is connected from the delivery pump with a hand-tightened plastic union onto a pressure regulator valve. Pressure is maintained at 15 psi to deliver the desired flow. A plastic filter with a 200-mesh synthetic screen, and an externally attached faucet, are installed behind the pressure regulator on the main supply line. The faucet provides water for washing the screen after each use.

The supply line is assembled with 2-inch PVC (polyvinyl chloride) pipe, although steel or plastic lines may be used. Drip irrigation lines with attached compression fittings are connected to flow controls rated at 1 gallon per minute, and to the supply line tees (fig. 2). Poly emitter hose with emitters spaced 1 ft apart is used for the drip irrigation line. The length of the poly hose can vary to accomodate individual needs. Emitters may be installed individually at any desired spacing. Compression end plugs seal the ends of the irrigation lines.

A Field Test

The system was tested on fairly steep east- and west-facing slopes. The east-facing irrigation plot was 75 feet long upslope, 50 feet long on the contour, on a 30% slope. The west-facing plot was 50 feet long upslope, 50 feet long on the contour, and a 38% slope.

[1]*The research reported here is a contribution to the SEAM program. SEAM, an acronym for Surface Environment and Mining, is a Forest Service program to research, develop, and apply technology that will help maintain a quality environment and other surface values while helping meet the Nation's mineral requirements.*

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Grasses and shrubs were drilled on the two slopes prior to installation of water lines. Plots were straw mulched and mechanically crimped.

Irrigation was begun on May 9, 1977. Approximately 50 minutes were required to deliver 500 gallons of water through the 500 emitters on the 10 drip lines. The screen was washed routinely after every watering. Plots were irrigated three times weekly for the first 3 weeks during germination of the seeded species, then twice a week for 5 more weeks. Natural precipitation then maintained the seedlings through the growing season. After the first growing season, plant densities averaged two plants per square foot on irrigated plots which was twice as much as the density on non-irrigated similar areas.

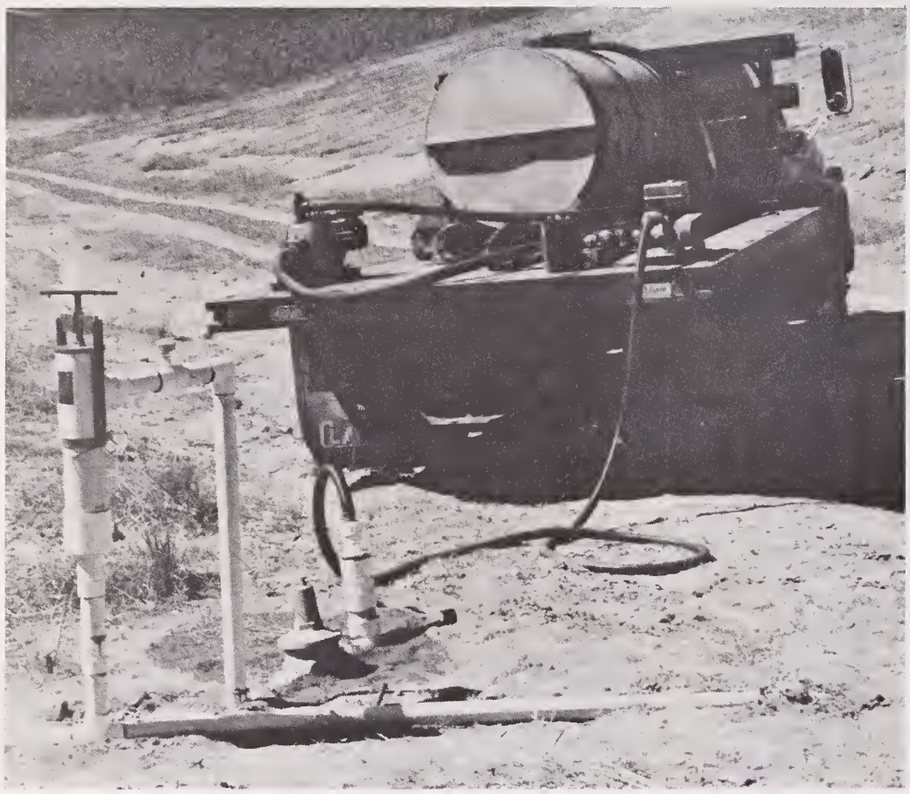

Figure 1.—A portable irrigation system.

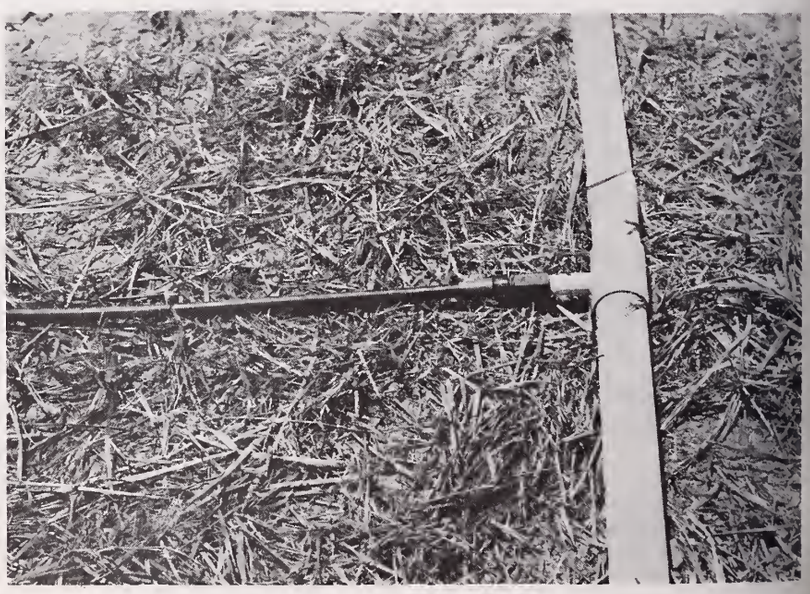

Figure 2.—Drip lines with attached compression fittings are connected to flow controls, and to the supply line tees.